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NAVY MEDICINE IN FOCUS

## Laser-Induced Antimicrobials May Eradicate Combat-Related Pathogens

BY VJOHNSON – FEBRUARY 18, 2014

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Researchers at the Naval Medical Research Unit (NAMRU) San Antonio laboratory. (Photo courtesy of NAMRU-San Antonio)

SAN ANTONIO – Researchers at the Naval Medical Research Unit San Antonio (NAMRU-SA) are developing a new treatment for methicillin-resistant *Staphylococcus aureus* (MRSA) maxillofacial infections as an alternative to conventional antibiotics. Along with conventional multi-drug resistance, a challenging factor to successful treatment of infection is the formation of bacterial biofilms within the wound that act as a physical barrier against antibiotics and the host immune system, which impairs wound healing.

New approaches being developed at NAMRU-SA to overcome both traditional multi-drug resistance and biofilm resistance mechanisms include pulsed laser irradiation combined with energy absorbing nanoparticles targeted against MRSA. Researchers hope this will significantly decrease the viability of the bacteria in planktonic and biofilm forms via generation of photothermal processes that induce physical damage to the bacterial cell wall and the biofilm matrix. This approach could provide effective at eradicating pathogens regardless of their level of antibiotic resistance.

If successful, this new treatment regime will give health care providers an alternative, non-pharmaceutical approach to treating combat wounds.

Combat wounds often present with a high rate of contamination from the environment and



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quickly become infected. Treatment of combat-related wound infections is complicated because a significant percentage is caused by multi-drug resistant bacteria such as MRSA.

NAMRU-SA’s mission is to conduct medical, dental, and directed energy biomedical research to enhance the health, safety, performance, and operational readiness of Navy and Marine Corps personnel and addresses their emergent medical and dental problems in routine and combat operations.



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